



NOAA Teacher at Sea
James Miller
Onboard NOAA Ship RAINIER
August 13 - 27, 2005

Log 4

Day 6: Thursday, August 18, 2005

Location: Anchored in Fish Range Bay; north of Mitrofinia Island

Weather: Sunny, low 70's

Wind: variable

Seas: 1-2 foot swell

Itinerary: Working in Fish Range Bay area for couple of days

Science and Technology Log

Got up early this morning (6:30am) so I could eat a big breakfast and get my gear loaded into the launch and. I was assigned to launch RA-3 with an Officer, a Surveyor, and a Coxswain (boat handler). Last night I was briefed on all the safety equipment on the launches as well as how to board and disembark. The survey launches are 29-foot aluminum boats with a small cabin that houses the survey computers. There's a total of 6 survey launches, two of which are water jet powered for shallow surveys, and the remaining launches have single inboard diesel engines.

The launches are also fitted with either multibeam or single-beam sonars. The multibeam sonars scan a wide path of the bottom, about three times the depth of the water. For example, if we are in 50 feet of water the sonar cone is scanning a path about 150 feet wide. The multibeam sonars are less powerful than single beam sonars, therefore, are primarily used in shallower waters. The single beam sonar scans a much narrower path and also uses a more powerful signal and is often used in deeper water. An astonishing fact for the day is that a single sonar could cost as much as \$500,000. The launch I was in today was fitted with a multibeam.

Our Plan of the Day (POD) indicated that we would be scanning areas around Fish Range Bay. The POD has the track lines that you are to work on laid out on a paper chart. The track lines are also set up on one of the onboard computers. There are basically three main computers onboard that are all interconnected.

One computer acts as a GPS and has all the track lines we are to follow pre-programmed. The coxswain also has a terminal at the helm so he/she can steer the boat onto the track line. It's kind of like a PacMan game for the coxswain, or as they call it "mowing the lawn". Depending on where you are working, the track line can be as long as 8 miles long or longer. We were working relatively close to the shore so our lines for the day were no longer than one mile.

Another onboard computer is designed to record data related to the movement of the boat. As the boat scans a track line the boat rolls (side to side motion), pitches (from front to back), and heaves (up and down). The sonar signal coming from the bottom of the boat is similar to the shape of an ice cream cone. These motions have an impact on the way the signal records or sees the bottom. So to ensure the quality of the bottom data collected, this motion information is fed into a complex algorithm that will calculate a percent error and apply it to the data. It's truly some amazing stuff.

A third computer shows the actual sonar signal and the data it is collecting. On one of the screens you can see how the signal changes with the motion of the boat. Another screen shows the track lines you create with each pass of the sonar. See, the track lines are set up parallel to each other and close enough so that there is overlap. As you complete a track line the screen shows the actual signal coverage. On the boat they call this "mowing the lawn" because that is exactly what it looks like you are doing on the computer. Scanning every inch of the bottom. Another screen produces a 3-D image of the bottom, and yet another screen shows the motion of the boat in the form of sinusoidal curves.

In addition, before we can begin scanning the bottom we also have to lower a gauge called a cast down to the bottom to record temperature, salinity, and density of the water. After we retrieve it, we hook it up directly to the computer to download the information. These factors have an impact in the way that the sonar signals travel through the water column; therefore, this data is also fed into the algorithm to ensure high quality readings.

It's truly amazing how much effort and attention is given to obtaining an accurate image of the ocean bottom. Their philosophy simply seems to be, if we're going to do it, let's do it right!

Personal Log

It was a very interesting day and I learned much. I had an opportunity to rotate into each of the positions including steering the launch on track lines and operating the computer. Since the weather was so good, the CO extended the working day, so we were in the launches for about ten hours today. At lunch, I couldn't resist fishing for halibut, so I dropped a line down for about ten minutes and caught my first. It was very small for AK halibut standards, but definitely a trophy fish where I come from. It's after eleven o'clock and I'm exhausted. I looked on tomorrow's POD and I'm on RA-5 (the leaker). This should be interesting!